Space Weather Forecast

Issued on Thursday 3 October 2024 at 01:11 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 Blackouts expected, chance of further R3 Blackouts. G1-G2/Minor-Moderate Geomagnetic storms likely, Slight Chance G3/Strong storm days 2&3.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with a number of Moderate class flares in the past 24 hours. There are currently 10 active regions on the visible disk. The most complex region resides near south centre disc, with two deltas present. The second most complex region is in the northwest close to centre disk, with an elongated delta spot in the trailing portion. The largest region is close to the northeast limb, but exact classification remains difficult due to foreshortening. Two spots in the southwest are also of note, both with moderate magnetic complexity. The remaining regions are smaller and appear relatively benign.

The Strong flare on 01 Oct produced a coronal mass ejection, with an Earth-directed component expected later in the period.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of a slow regime. Speeds fell from slightly elevated to slow ambient. The Interplanetary Magnetic Field remained at weak levels. The north-south component remained at weak values. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Moderate, with further Moderate class flares expected and a chance of returning to High should another isolated Strong flare occur.

Solar Wind / Geomagnetic Activity: Slight chance of a glancing coronal mass ejection from 29 Sep on day 1 (03 Oct). Likely shock and glancing blow from the X7.1 flare coronal mass ejection from 01 Oct on days 2 or 3 (04/05 Oct). In the absence of any coronal mass ejections, solar wind speeds should remain slow-ambient.

Quiet (Kp 0-2) geomagnetic conditions are expected days 1-2. There is a slight chance of Active to G1/Minor storms (Kp4-5) day 1 (03 Oct) from a possible glancing blow of 30 Sep coronal mass

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ejection. Later day 2 and during day 3 (04-05 Oct) the possibility of the X7.1 coronal mass ejection arrival sees a likelihood of G1-G2/Minor-Moderate Geomagnetic storms and a slight chance of G3/Strong Geomagnetic storm.

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to persist at background levels, with a slight chance of rising above should further notable flares occur during the forecast period.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	40	60	5
Strong	G3	No	1	15	20	1
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	70	70
Very Active	R3-R5 (X Class)	No	30	30	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	20	20
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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